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**ETV2 expression increases the efficiency of primitive endothelial cell derivation from human embryonic stem cells.**

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**Funding Grants:** Etsrp/ER71 mediated stem cell differentiation into vascular lineage

**Public Summary:**

**Scientific Abstract:**

BACKGROUND: Endothelial cells line the luminal surface of blood vessels and form a barrier between the blood and other tissues of the body. Ets variant 2 (ETV2) is transiently expressed in both zebrafish and mice and is necessary and sufficient for vascular endothelial cell specification. Overexpression of this gene in early zebrafish and mouse embryos results in ectopic appearance of endothelial cells. Ectopic expression of ETV2 in later development results in only a subset of cells responding to the signal. FINDINGS: We have examined the expression pattern of ETV2 in differentiating human embryonic stem cells (ESCs) to determine when the peak of ETV2 expression occurs. We show that overexpression of ETV2 in differentiating human ESC is able to increase the number of endothelial cells generated when administered during or after the endogenous peak of gene expression. CONCLUSIONS: Addition of exogenous ETV2 to human ESCs significantly increased the number of cells expressing angioblast genes without arterial or venous specification. This may be a viable solution to generate in vitro endothelial cells for use in research and in the clinic.

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